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# REPORT OF THE THIRD MEETING OF THE CO-ORDINATING COMMITTEE OF THE CAIRO-GABORONE TRANS-EAST AFRICAN HIGHWAY

(Addis Ababa, 16 to 20 December 1980)

LO/NAIROBI

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**ANNEX**

CURRENT STATUS OF THE CAIRO-GABORONE TRANS-EAST AFRICAN HIGHWAY

A. Organization and attendance

1. The third meeting of the Co-ordinating Committee of the Cairo-Gaborone Trans-East African Highway was held in Addis Ababa from 16 to 20 December 1980.

2. A mini-rally was organized by the host Government to the Awasa-Dilla project on 14 and 15 December 1980, where participants were able to observe the progress of the construction of the Awasa-Dilla link, as well as the condition of the Addis Ababa Awasa highway, which is a segment of the Cairo-Gaborone Trans-East African Highway within Ethiopia.

3. The meeting was attended by representatives of Botswana, Egypt, Ethiopia, Kenya, the Sudan and the United Republic of Tanzania (members) and Burundi, Malawi and Zimbabwe (associate members).

4. The meeting was also attended by representatives of the following industrialized countries, financial and international organizations:

(a) Industrialized countries: France, the Federal Republic of Germany and the United States of America.

(b) Financial institutions: European Economic Community.

(c) International organizations: International Labour Organization (ILO), International Road Federation (IRF), Organization of African Unity (OAU), World Food Programme (WFP).

5. The meeting was opened by Mr. Adebayo Adedeji, Executive Secretary of ECA. He called upon Mr. Yusuf Ahmed, Minister of Transport and Communications of the Provisional Military Government of Ethiopia and member of the Central Committee of COPWE, who welcomed participants on behalf of the Government of Ethiopia. He said that Ethiopia was honoured to act as host to the third meeting, pursuant to the decision of the Co-ordinating Committee at its second meeting held in Khartoum, the Sudan, in March 1978.

6. The development of transport services in general and highways in particular would greatly promote intra-African co-operation and ECA, which had been entrusted to co-ordinate the planning and development of transport facilities since 1962-1963, had been instrumental in promoting intergovernmental consultations in transport planning, which in turn had resulted in the proclamation by the United Nations General Assembly of 1978-1988 as the Transport and Communications Decade in Africa.

7. The Lagos Plan of Action underscored the importance of development of the African transport system and actions taken by OAU, ECA and the United Nations

in general clearly manifested the importance attached to transport development. Road transport of course played a prominent role in the promotion of the economic, social and cultural integration of the continent.

8. Ethiopia attached great importance to the development of the Trans-East African Highway and was determined to improve the segment of the Highway within Ethiopia, which started at Metema on the Sudan border, passed by Lake Tana, the source of the Blue Nile, proceeded across the Blue Nile gorge to Addis Ababa and then followed the Rift Valley lakes region to terminate at Moyale on the Kenya border. With the exception of the Azezo-Metema section (172 km), the road was all-weather standard with bitumen surfacing from Debre Marcos to Moyale; and Azezo-Metema was one of several projects planned for joint implementation with the Sudan's Gedaref-Gallabat. Ethiopia was also planning to improve the all-weather road from Debre Marcos to Moyale. It also recognized the importance of removing non-physical barriers and towards that end was determined to simplify frontier formalities.

9. The agenda of the meeting, as prepared by ECA, held important issues for discussion, including the current status of the Trans-East African Highway and the establishment of the Trans-East African Highway Authority. He hoped the deliberations would result in important conclusions that would strengthen the objectives of the Highway.

10. The Minister concluded that participants who had the opportunity to visit parts of the Highway in Ethiopia would observe the political, economic and cultural achievements of the Ethiopian people since the 1974 popular revolution.

11. He also extended his appreciation to the Executive Secretary of ECA for the dynamic actions taken in promoting the Trans-East Afr can Highway project.

12. In his statement, Mr. Njomatchoua Toko, Director of Economic Development and representative of the OAU Secretary General presented the latter's apologies for the various official commitments that had kept him from participating personally in the work of the Committee. After having thanked the Ethiopian Government for hosting the third meeting of the Cairo-Gaborone Trans-East African Highway Co-ordinating Committee, he described the various actions that had been undertaken by both OAU and ECA to promote transport and communications in Africa in order to facilitate economic integration. Particular emphasis was placed on the Transport and Communications Decade in Africa and the Lagos Plan of Action.

13. The Final Act of Lagos, the basic document outlining the major stages for achieving an African Economic Community, referred to the Lagos Plan of Action and confirmed the total commitment of African Heads of State and Government to the measures taken in Africa to establish regional structures and strengthen those already in existence.

14. The meeting was indispensable to the attainment of those objectives and had been possible because participants were convinced that, because of the difficultire of transport and communications in Africa, pooling available resources and the experiences of each participant would allow for a more objective, more effective and more appropriate approach to developing an authentic regional policy of co-operation, co-ordination and integration, as called for by the Final Act of Lagos.

15. Mr. Adebayo Adedeji, Executive Secretary of ECA, welcomed participants to the third meeting of the Co-ordinating Committee and, on behalf of ECA and the Committee, expressed his gratitude to the Provisional Military Government Ethiopia for agreeing to host the meeting and for organizing the mini-rally to the southern Rift Valley lakes area of Ethiopia through which the Trans-East African Highway passed. He also thanked the representatives of the industrialized countries for their continued support to the Trans-East African Highway project.

16. It had been in 1976 that the Co-ordinating Committee first met at Africa Hall and established the final alignment of the Cairo-Gaborone Highway and the Co-ordinating Committee. The second meeting, held in Khartoum in 1978, had considered the establishment of the Trans-East African Highway Authority and towards that end, reviewed and adopted the Constitution for the Authority.

17. One of the most important agenda items was the establishment of the Trans-East African Highway Authority. ECA had prepared and distributed all the necessary documents, including the draft Constitution of the proposed Authority, its recommended organizational structure, initial programme of work and estimated budget and it was imperative that participants came to a unanimous decision on all issues including the date of establishment of the Authority.

18. Another important item was the proposed African Highway Code (prepared in outline form by ECA) which was intended to combat the ever-increasing incidence of traffic accidents on African highways. He called upon participants to review the outline code, adopt it and endorse its preparation in final form.

19. Still another very important item on the agenda was the study to establish an African Highway Master Plan. The African highway system consisted of scattered national networks with little resemblance to a continental network. The Master Plan was considered a sine qua non for the most rational development of African highways for the purpose of engineering an internally generated self-sustaining process of development. He therefore urged participants, particularly representatives of industrialized countries, to support the African Highway Master Plan study.

20. There was still a tremendous amount of work to be done on the Trans-East African Highway in terms of infrastructure improvement, facilitation of frontier formalities and institution building.

21. He concluded by stating that the future development of the Trans-East African Highway would depend, to a great extent, on the decisions made during the current meeting and that the Committee needed to agree to a target date for completion of the project well within the period of the United Nations Transport and Communications Decade in Africa, 1978-1988. The Executive Secretary assured participants that ECA would do everything possible and reasonable to pursue vigorously the implementation of all the decisions of the meeting.

22. Hon. N.N. Njuno, Assistant Minister of Transport and Communications of Kenya, and leader of the Kenya delegation thanked the Minister of Transport and Communications of Ethiopia, and through him the head of State, Government and people of Ethiopia for hosting the meeting and organizing the minibus tour to the Awasa-Dilla project on the Addis Ababa-Nairobi highway.

23. He stated that Kenya and Ethiopia had for several decades been partners in many aspects. This was underscored by the recent state visit to Kenya by Chairman Mengistu Haile Mariam whom Kenyans regarded as a very great leader committed to the development of the whole of Africa. His delegation was in Addis Ababa to seek ways and means of obtaining tractors instead of tanks, and hoped that that the sort of attitude would prevail throughout the region.

24. He concluded by thanking, on behalf of all the delegates, the host Government for the hospitality extended to participants, particularly during the excursion to the southern Rift Valley lakes area of Ethiopia through which the Trans-East African Highway passed.

Election of officers

25. The following representatives were elected as officers of the third meeting of the Co-ordinating Committee:

Chairman, Ethiopia
Vice-Chairman, Kenya
Rapporteur, Zimbabwe

26. The ECA Trans-African Highways Programme co-ordination staff assisted with the production of the report.

B. Agenda

27. The following agenda was adopted:

1. Opening of the meeting
2. Election of officers
3. Adoption of the agenda and organization of work
4. Report on the current status of the Trans-East African Highway and its feeder roads in each country
5. Establishment of the Trans-East African Highway Authority
6. Application of remote sensing techniques to highway engineering in the Trans-East African Highway region

7. Relevant resolutions adopted by other trans-African highway authorities
8. Impact of the United Nations Transport and Communications Decade in Africa (UNTACDA) on highway development in the Trans-East African Highway region
9. African Highway Master Plan: prospects and benefits
10. Other matters
11. Adoption of the report

C. Summary of proceedings

Admission of Zimbabwe

28. Newly independent Zimbabwe had been invited by the Executive Secretary of the Economic Commission for Africa to participate in the deliberations of the Co-ordinating Committee for the first time. In an effort to formalize Zimbabwe's admission into the family of States members of the Trans-East African Highway system, the Chairman recognized the presence of Zimbabwe among participants at the third meeting of the Co-ordinating Committee.

29. Dr. Mariyawanda Nzuwah, Deputy Secretary of the Ministry of Roads, Road Traffic, Posts and Telecommunications and leader of the Zimbabwean delegation expressed, on behalf of the Government and people of Zimbabwe, his sincere gratitude and appreciation to the Government and people of Ethiopia for the very warm welcome and generous hospitality accorded them since their arrival. People everywhere were eager and curious to know how the newly founded Republic was faring, which manifested a genuine desire on the part of Ethiopians to establish lasting and meaningful friendly relations with the people of Zimbabwe.

30. He expressed also his Government's sincere gratitude to the Economic Commission for Africa and particularly to its Executive Secretary, for extending the special invitation to the newly independent Republic of Zimbabwe to join fellow sovereign Africans in the very important task of developing the trans-African highway system. Merely 12 months ago the broad masses of Zimbabwe had been toiling under the yoke of racists and colonialists, and were dying by the thousands; and yet, through determination, resoluteness and sacrifice, they had overcome oppression and emerged victorious. It was through that same spirit that Zimbabwe accepted ECA's invitation to join the task of developing transport and communications throughout Africa, a task which Zimbabwe considered a matter of utmost importance.

31. He concluded by assuring participants of Zimbabwe's commitment to play a meaningful part and make relevant contributions, within the limits of its resources, to the very necessary development plan of the Cairo-Gaborone Trans-East African Highway.

32. Kenya then proposed that Zimbabwe should be admitted forthwith to associate membership of the Cairo-Gaborone Trans-East African Highway Co-ordinating Committee. The proposal was seconded by the United Republic of Tanzania, and adopted by acclamation.

Report on the current status of the Cairo-Gaborone Trans-East African Highway

33. The Committee reviewed the status of the main Cairo-Gaborone Trans-East African Highway and its feeder links, based on oral reports delivered and/or written reports submitted by representatives of member and associate member countries.

34. The summary of the current status of the Trans-East African Highway and its feeder links is annexed to this report.

Establishment of the Trans-East African Highway Authority

35. The meeting reviewed the draft constitution of the proposed Trans-East African Highway Authority, and its recommended organizational structure, programme of work, estimated budget and terms of reference of senior officials. After some amendment, the meeting adopted them and also agreed to sign the Constitution on Friday, 19 December 1980.

(a) Constitution of the Trans-East African Highway Authority

36. The wording of the Constitution was generally improved to conform to international legal documents without in any manner changing the Constitution in substance.

(b) Terms of reference of Director General[1/]

Qualifications, para. (d), The paragraph was revised to read:

"(d) Have a good knowledge of English, and be able to write well in that language."

(c) Terms of reference of Deputy Director General[2/]

Qualifications, paragraph (i) and (iii) these paragraphs were revised to read:

"(i) Have a post graduate degree in economics and have at least...."

"(iii) Have a good knowledge of English and be able to write well in that language."

Determination of the location of the headquarters of the Trans-East African Highway Authority

37. The Committee, in response to the invitation of Kenya to host the headquarters of the Authority, approved Nairobi as the seat of the Trans-East African Highway Authority.

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1/ E/CN.14/TRANS/160, annex II, page 12.
2/ E/CN.14/TRANS/160, annex II, page 14.

Establishment of the official date of commencement of work of the Authority

38. The Committee designated 1 January 1982 as the date for the official commencement of work of the Authority.

Approval of the programme of work

39. The Committee reviewed the programme of work of the Authority prepared by ECA, and approved the programme of work as presented.

Relevant resolutions adopted by the other trans-African highway authorities 3/

40. The Committee reviewed in some detail the proposed African Highway Code as outlined by ECA, and the draft constitution of the proposed African Highway Association, including the resolutions of the Governing Council of the Mombasa-Lagos Trans-African Highway Authority adopted at Bangui in July 1980, regarding both the Code and the Association.

(a) African Highway Code 4/

41. The Committee adopted the African Highway Code as outlined by ECA in its entirety, and called upon ECA to pursue its preparation in final form and distribution to all African countries for their perusal.

(b) African Highway Association 5/

42. The Committee reviewed the events that had led to the current stalemate in the establishment of the African Highway Association, and decided to call upon ECA and OAU to reconvene the interim committee that had been established to pursue the rapid establishment of the Association.

Impact of the United Nations Transport and Communications Decade in Africa on the Trans-East African Highway 6/

43. The Committee reviewed the progress of the United Nations Transport and Communications Decade in Africa in general, and its impact in the development of road transport in the Trans-East African Highway system, in particular. It expressed satisfaction with ECA's efforts to promote the development of road transport in Africa and called upon member States to adhere to the priorities established by the African Ministers of Transport, Communications and Planning in the implementation of national transport and communications projects. The Committee, in recognition of the importance of the programme of the United Nations Transport and Communications Decade in Africa for the development of road transport throughout Africa, called on member States to start work on the identification and preparation

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3/ E/CN.14/TRANS/161.
4/ E/CN.14/TRANS/161 annex III. (E/CN.14/TRANS/153)
5/ E/CN.14/TRANS/161 annex IV.
6/ E/CN.14/TRANS/163 and E/CN.14/726/Add.1, E/CN.14/TRANS/147/Add.1.

of road projects for the forthcoming second phase of the programme of the United Nations Transport and Communications Decade in Africa.

African Highway Master Plan 7/

44. The Committee, after reviewing the merits, feasibility and prospects of an African Highway Master Plan, recognized the Trans-East African Highway development effort as a significant input to the Master Plan study. It commended ECA on its initiative to launch that timely study and called upon member countries and the international community to support in concrete terms the study of the African Highway Master Plan.

Date and place of the next meeting

45. The Committee accepted the offer of the Republic of Kenya to host the next meeting. The date of the next meeting was agreed to be October-November 1981.

Adoption of the report and closure of the meeting

46. The present report was adopted at the closing session on 19 December 1980.

47. Representatives of the following member countries then signed the Constitution establishing the Cairo-Gaborone Trans-East African Highway Authority:

(a) Egypt
(b) The Sudan
(c) Ethiopia
(d) Kenya

48. After an exchange of courtesies, the Chairman declared the meeting closed.

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7/ E/CN.14/TRANS/162.

ANNEX

CURRENT STATUS OF THE CAIRO-GABORONE TRANS-EAST AFRICAN HIGHWAY

A. EGYPT

The part of the highway which concerns Egypt is that connecting it with the Sudan, either by the Cairo-Suez Red Sea coastal road or by a road along the Nile.

A high-level committee composed of representatives from Egypt and the Sudan met on 1 October 1977 and approved the construction of the road along the Nile. As soon as the Sudanese and Egyptian Governments had secured sufficient financing, construction would begin. However, Egypt immediately started constructing the unpaved portion in Egypt from High Dam, 19 km west of Aswan, to Wadi Halfa. Furthermore, Egypt is also constructing the road along the Red Sea coast to the borders of the Sudan.

The current status of the road along the Nile which had been approved by the high-level committee as well as of the coastal road are given in the following tables:

(a) The road along the Nile

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Cairo-Elmarazik | 23 | | | 23 | Divided with double carriageways, 7.5 m each direction, bitumenized |
| Elmarazik-Elayat | 30 | | | 30 | 2-lane, 7.5 m wide, paved; another carriageway to be divided as above is being constructed; expected completion date : end 1981 |
| Elayat-Aswan-High Dam* | 907 | | | 907 | 2-lane, 7.5 m wide, bitumenized |
| High Dam-Km 150* | 150 | | | 150 | 2-lane, 7.5 m wide; construction to be completed by end 1981 |
| Km 150-Abu Sumble* | | | 70 | 70 | Under detailed study; construction to start end 1981 |
| Abu Sumble-Wadi Halfa* | | | 100 | 100 | Preliminary study; detailed study to start after above study |
| TOTAL | 1,110 | | 170 | 1,280 | |

* Doubling the carriageway starts on stages whenever traffic counts show its necessity.

(b) The coastal road

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Cairo-Suez | 134 | | | 134 | Divided with double carriageways, 7.5 m each direction |
| Suez-Zafarana | 106 | | | 106 | 2-lane, 6.0 m wide; widening to 7.5 m and resurfacing underway, to be completed by end 1983 |
| Zafarana-Ras Gareb | 119 | | | 119 | 2-lane, 6 m wide; study underway for widening to 7.5 m and resurfacing |
| Ras Gareb-Ghardaka | 146 | | | 146 | 2-lane, 6 m wide; widening to 7.5 m and resurfacing underway, to be completed end 1982 |
| Ghardaka-Bernice | 432 | | | 432 | 2-lane, 6 m wide; study underway for widening to 7.5 m and resurfacing |
| Bernice-Sudan frontier | | | 250 | 250 | Study for construction underway |
| TOTAL | | | | 1,187 | |

The extension of the Nile road in the Sudan will pass through Dongola to Khartoum, Wad Medani, Gadaref, Gallabat and Metema (Ethiopia), while the extension of the coastal road will pass through Port Sudan, Haiya, Kassala, G daref, Gallabat and Metema.

The geometric design and structural standards are basically of the AASH TLO standards, using appropriate regional factor for Egypt.

(c) Feeders

Feeders to the Trans-East African Highway (along the Nile road) are given in the following table:

| Section | Road surface condition (km) Total | All weather | Dry weather | Remarks |
|---|---|---|---|---|
| Alexandria-Cairo agricultural road | 208 | 208 | | Divided with double carriageways, 7.5 m wide in each direction (part of the Cairo-Nouakchott Highway); bitumenized |
| Alexandria-Cairo desert road | 200 | 200 | | 2-lane, 7.5 m wide; bitumenized |
| Port Said-Ismailia | 84 | | | 2-lane, 8.0 m wide; bitumenized |
| Ismailia-Cairo | 120 | 120 | | Divided with double carriageways, 7.5 m wide; bitumenized |
| Suez-Cairo | 130 | 130 | | Divided with double carriageways, 7.5 m wide; bitumenized |
| Zafarana-Kurimat | 250 | 250 | | 2-lane, 7.5 m wide; bitumenized |
| Safaga-Quena | 160 | 160 | | 2-lane, 7.5 m wide; bitumenized |
| El Kosseir-Quft | 145 | 145 | | 2-lane, 7.5 m wide; bitumenized |
| Marsa Alam-Edfu | 225 | 225 | | 2-lane, 7.5 m wide; bitumenized |
| Bernice-Aswan | | | 250 | Earth road; under study |

B. THE SUDAN

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Wadi Halfa-Dongola | | | 400 | 400 | Engineering design completed; financing for construction being sought |
| Dongola-Khartoum | | | 547 | 547 | Prefeasibility study to start soon |
| Khartoum-Wad Medani | 187 | | | 187 | |
| Wad Medani-Gedaref | 227 | | | 227 | |
| Gedaref-Gallabat-Metema (Ethiopia fr.) | | | 155 | 155 | Engineering design completed; financing to be sought; EEC approached |
| TOTAL | 414 | | 155 | 1,516 | |

(a) Feeder links to the Cairo-Gaborone Trans-African Highway

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| El Uweinat-Selima | | | 470 | 470 | |
| Selima-Abri | | | 130 | 130 | |
| Total Libyan Arab Jamahiriya-Sudan | | | 600 | 600 | |

(b) Feeder link from the Red Sea

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Port Sudan-Haiya | 204 | | | 204 | |
| Haiya-Kassala | 350 | | | 350 | |
| Kassala-Gedaref | 220 | | | 220 | |
| Gedaref-Gallabat-Metema (Ethiopia fr.) | | | 155 | 155 | Engineering design completed; financing for construction to be sought |
| TOTAL | 774 | | 155 | 929 | |

C. ETHIOPIA

| Section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Gallabat/Metema-Chilga-Azezo | | | 172 | 172 | To be upgraded to feeder standard |
| Azezo-Dejen | 81 | 415 | | 496 | Bitumenization of Dejen-Debre Marcos section completed |
| Dejen-Addis Ababa | 233 | | | 233 | |
| Addis-Ababa-Modjo | 72 | | | 72 | Bitumen overlay planned |
| Modjo-Awasa | 204 | | | 204 | Bitumen overlay planned |
| Awasa-Dilla | 56 | 27 | | 83 | Bitumenization expected to be completed in February 1981 |
| Dilla-Yabello | 208 | | | 208 | |
| Yabello-Moyale | 210 | | | 210 | |
| TOTAL | 1,064 | 432 | 172 | 1,668 | |

(a) Trans-East African Highway: Work programme 1978-1982

| Section | Length (km) | Existing surface | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|---|
| Metema-Azezo | 172 | E | F | D | E | CF | CF |
| Azezo-Debre Marcos | 422 | G | M | M | M | M | M |
| Debre Marcos-Dejen | 81 | B | CB | CB | CB | CB | M |
| Dejen-Addis Ababa | 233 | B | M | M | M | M | M |
| Addis Ababa-Awasa | 276 | B | M | M | M | AO | AO |
| Awasa-Dilla | 83 | BG | CB | CB | CB | M | M |
| Dilla-Moyale | 418 | B | M | M | M | M | M |

Existing surface condition: E - Earth (dry weather only); G - Gravel (all weather); B - Bitumen

Next phase: F - Feasibility study; D - Engineering design; CG - Construction gravel standard; CF - Construction feeder standard; CB - Construction to bitumen standard; M - Maintenance (including upgrading to bitumen surfaced roads); AO - Asphalt overlay

(b) Feeder links to the Cairo-Gaborone Highway: Summary of current status

| Country and section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| 1. DJIBOUTI | | | | | |
| Djibouti-Ali Sabieh | 74 | | 22 | 96 | |
| Ali Sabieh-Dewale (fron.) | | | 9 | 9 | |
| TOTAL DJIBOUTI | 74 | | 31 | 105 | |
| 2. ETHIOPIA | | | | | |
| Dobi-Dio | 28 | | | 28 | |
| Dewale-Dire Dawa | | | 217 | 217 | |
| Dire Dawa-Alemaya | 21 | | | 21 | |
| Alemaya (Jct.)-Modjo | 155 | 278 | | 433 | Common section; see 3(i) below |
| TOTAL ETHIOPIA | 204 | 278 | 217 | 699 | |
| TOTAL DJIBOUTI/ETHIOPIA | 278 | 278 | 248 | 804 | |

| Country and section | Road surface condition (km) Bitumen | Gravel | Earth | Total | Remarks |
|---|---|---|---|---|---|
| Tug Wejale-Jijiga | | | 154 | 154 | |
| Jijiga-Alemaya | 34 | 105 | | 139 | |
| Alemaya-Awash | | 278 | | 278 | |
| Awash-Modjo | 155 | | | 155 | |
| TOTAL ETHIOPIA/SOMALIA | 189 | 383 | 154 | 726 | |

(c) Design standards for primary highways: Ethiopia

| | | |
|---|---|---|
| 1. | Design speed (kph) | |
| | Flat | 100 |
| | Rolling | 80 |
| | Mountainous | 40 |
| 2. | Right-of-way width (m) | 30 |
| 3. | Road way width (m) | |
| | Flat | 8 |
| | Rolling | 8 |
| | Mountainous | 8 |
| 4. | Carriage way width (m) | |
| | Flat | 8 |
| | Rolling | 6 |
| | Mountainous | 6 |
| 5. | Shoulder-width (m) | |
| | Flat | 1 |
| | Rolling | 1 |
| | Mountainous | 1 |
| 6. | Minimum radius of horizontal curve (m) | |
| | Flat | 330 |
| | Rolling | 180 |
| | Mountainous | 55 |
| 7. | Pavement slope (%) | 2.5 |
| 8. | Shoulder slope (%) | 4.0 |
| 9. | Type of pavement | Double surface treatment |
| 10. | Maximum super. elevation (%) | 10 |
| 11. | Maximum vertical grade (%) | |
| | Flat | 6 |
| | Rolling | 7 |
| | Mountainous | 10 |

12. Bridge

| | | |
|---|---|---|
| (a) | Loading | H20, S16 |
| (b) | Minimum width face-face curbs (m) | 7.30 |
| (c) | Minimum width face-face trailings, trusses, head walls, etc. (m) | 8.30 |
| (d) | Minimum vertical clearance (m) | 4.40 |
| (e) | Minimum side walk (m) | 0.50 |

(d) Vehicle specifications: Ethiopia

1. Weights and loading

| | | | |
|---|---|---|---|
| (a) | Maximum total loaded weight (excl. trailer) (kg) | 38,000 | |
| (b) | Maximum wheel load (kg) | 6,000 | |
| (c) | Maximum single axle load (kg) | 12,000 | (TEAH: 8,000) |
| (d) | Maximum tandem axle load (kg) | 22,000 | |

2. Vehicle dimensions

| | | | |
|---|---|---|---|
| (a) | Over-all width (m) | 2.50 | (TEAH: same) |
| (b) | Over-all height (m) | 3.80 | (TEAH: 4.50) |
| (c) | Over-all length (m) | | |
| | - 2 axles | 16.75 | |
| | - 3 axles | 19.80 | |
| (d) | Articulated vehicle (m) | 7.10 | |
| (e) | Vehicle and trailer (m) | 19.80 | (TEAH: 22) |

D. KENYA

The Kenyan section of the Trans-East African Highway runs from Moyale to Namanga, a distance of about 950 km or roughly 11 per cent of the total length of the Highway. Already, 46 per cent of the Kenyan section is of bitumen standard and the rest is to engineered gravel standard.

There is a main feeder link of approximately 510 km running from Thika to Liboi on the Kenya/Somalia border. This route serves as the only main road link between Kenya and Somalia.

1. Current status of the Moyale-Namanga section

The main centres of population concentration along the Kenyan section of the Highway are at Moyale, Marsabit, Nanyuki, Nyeri, Thika, Nairobi, Kajiado and Namanga. The road, in most cases, follows the easiest line connecting the forementioned centres. The Kenyan section is to bitumen standard from Isiolo to Namanga, a total length of about 440 km. The section Moyale to Isiolo was completed to all-weather gravel road in 1974 although designs to bitumen standard are nearing completion. Sections of this road already to bitumen standard need widening, strengthening with bituminous overlay as the volume of traffic demands, realignment for improving standards. To this end, financial allocation has been made for work to commence during the current Development Plan.

(a) Moyale-Isiolo

This section of the Moyale-Namanga road comprising approximately 510 km, or 55 per cent of the total length, is to gravel standard. The road was built during the period 1966-1974 by an Italian firm with the use of Ministry of Works and National Youth Service personnel.

The road has, however, suffered loss of the wearing course due to its lack of sufficient binder rendering the road improperly compacted. The 1977 heavy rains caused a lot of damage and a flood rehabilitation fund had to be sought by the Provincial Engineer, Central Province. The drainage structures were also inadequate and had to be extended.

As this road serves as a major international trunk road as well as a tourist road, the Government decided to undertake to pave it. In 1978, the Permanent Secretary of the Ministry of Transport and Communications commissioned a firm of consulting engineers (NorConsult AS) to carry out the feasibility studies, construction cost estimate and tender documents. In the terms of reference it was indicated that the new road was to follow the existing alignment as much as possible. The original design was to be 6.5 m single carriageway supported with 1.25 m paved shoulders, design speed of 100 kph and minimum of 60 kph, double seal surface dressing and the drainage structures to be designed to full HB loading and 25 years flood probability. However, according to the latest (January 1979) design manual of the Ministry of Transport and Communications, minor changes were recommended, i.e., 6.0 m carriageway supported with 1.0 m paved shoulders.

Due to the considerable length of the road, the consultant decided to split the whole project into five sections: (a) Moyale-Turbi (125 km), (b) Turbi-Marsabit (121 km), (c) Marsabit-Mirille River (128 km), Mirille River-Wambaa Junction (83 km) and (e) Wambaa Junction-Isiolo (53 km).

The consultants have so far submitted nearly all the draft documents for comment before the scheduled January 1981 final tender documents submissions. As at January 1979, the total construction costs were estimated at KSh 593.1 million. Construction work will start as soon as donor financing has been secured. In the meantime, however, the project has been submitted to the EEC for financing as part of the Ethiopia-Kenya regional development package.

(b) Isiolo-Nanyuki

This section forms approximately 82 km and traverses generally flat to rolling terrain with occasional hilly sections resulting in rather tortuous horizontal alignment. The road was improved from the old World War II road of 16 feet to 6 m wide pavement during 1973-1974. The pavement structure comprises 20-25 mm surface dressing and 130 mm lime stabilized gravel base. The pavement condition of the road can be described as fair.

(c) Nanyuki-Sagana

This section of the road comprises approximately 95 km with the pavement structure constructed to 20-30 mm surface dressing and 100-140 mm cement stabilized gravel base except for the section Kiganjo-Marua (9 km) which has 140 mm hand-packed

stone. The 6-m wide single carriageway without proper shoulders has suffered repeated high axle loading with a result that over most of its length the road is extensively damaged. The section Marua-Sagana has been earmarked for widening and strengthening during the current Development Plan with a view to strengthening the remaining part during the next development plan period.

(d) Sagana-Makutano

This road, comprising approximately 46 km, was constructed during the last development plan under the third African Development Bank programme. The pavement structure is made up of 20 mm surface dressing 130-200 mm cement stabilized gravel. The horizontal and vertical alignments are good with design speed of 100 kph, 1,000 m minimum radii. The single carriageway of 7.0 m is supported with 2.5 m shoulders. According to the pavement condition study carried out in 1978, the section Sagana-Muranga was still in good condition while the section Muranga-Makutano had shown failure.

(e) Makutano-Thika

This section of the road runs for approximately 11.0 km to the end of the dual carriageway at Thika. The horizontal and vertical alignments are generally poor, rendering the road to have an average speed of between 55 and 80 kph in an otherwise high-speed road. This is abbottleneck and the Government has now decided to realign the road to run on a completely new alignment. A firm of consulting engineers is doing the design work and documentation is nearing completion. At 1979 prices, the project is estimated to cost KSh 66.0 million and has now been suggested for financing by the Japanese Government as a high priority road.

(f) Thika-Nairobi

This section of the road has already been built to dual carriageway. It runs for 42 km linking the industrial town of Thika to Nairobi. Due to the heavy traffic it carries, sections of this road have deteriorated considerably and the road has been included in the current Development Plan for strengthening.

(g) Nairobi-airport T'off

This section, comprising approximately 13 km, was reconstructed to dual carriageway with 7.0-m-wide pavements and incorporating grade-separated intersections. This was carried out during the last development plan and was completed in early 1979. The project was financed under the fifth highway programme. The road, which was built with limited access, has a design speed of 100 kph. The minimum level of service based on the Kenyan highway capacity manual is 55 kph with a desirable maximum gradient of 3 per cent and absolute of 4 per cent. The road was designed to an absolute minimum of 1,000 m radius, minimum stopping sight distance of 150 m and a minimum overtaking sight distance of 65 m. The structures on this road were based on the BS, 153 HA loading, while the pavement composition of 100 mm asphaltic concrete and 130 mm of graded crushed stone was based on the A1 CBR curve.

This road, being section of A104/A109 international trunk road, has suffered high axle loading such that it warranted construction of a weighbridge. This is now operational.

(h) Airport T'off-Athi River

This section comprises of 16 km constructed to new alignment under the fourth highway programme. The pavement structure consists of 100 mm asphaltic concrete, 200 mm hand-packed stone. It is a single 7.0 m-wide carriageway and has a design speed of 100 kph. The pavement design was based on A1 CBR curve.

(i) Athi River-Mamanga

This section comprises of some 139 km which was constructed to bitumen standard during 1968-1969 with 6.1 m-wide pavement supported with 1.8 m shoulders. The pavement composition of bituminous seal on top 150 mm cement stabilized road base and selected sub-base material of various thickness. The construction was carried out under the first African Development Bank programme. Both horizontal and vertical alignment are good, although any drastic change in the heavy goods vehicles may lead to early pavement deterioration and hence call for strengthening and widening to standard 7.0 m-wide pavement.

2. Current status of Thika-Liboi feeder road link to the Trans-East African Highway

The main feeder link to the Trans-East African Highway is the route that connects Kenya with Somalia and runs from Thika to Liboi on the Kenya/Somalia border. The road comprises of approximately 500 km and is the only essential link between Somalia and Kenya's industrial town of Thika and ultimately to Nairobi, the capital.

(a) Thika-Garissa

This section of the Thika-Liboi road comprises of approximately 315 km. The existing road is characterized by narrow carriageway and shoulders, occasional low standard horizontal alignment, inadequate drainage structures and is heavily corrugated. The alignment soils are predominantly of red-brown sandy type with occasional black cotton soils.

In pursuing its policy of upgrading of the road network through selective bitumenization, the Kenyan Government has embarked on upgrading this section of the Thika-Liboi road. The work is at present being undertaken by the Ministry of Transport and Communications Director Labour Unit with the help of National Youth Service personnel. The road construction is being carried out in three sections, namely (a) Thika-Kangondi, (b) Kangondi-Kalange and (c) Kalange-Garissa. The feasibility study carried out for the first two sections showed high internal rates of return of 20.5 and 21.0 per cent respectively which is much higher than the opportunity cost of capital in Kenya.

The Government of Saudi Arabia has undertaken to finance the section Kangondi-Junction B8 (Garissa). Issue of tender documents is scheduled for January 1981 and the tender opening will be in March/April 1981. Contract award will be in May 1981 and thereafter construction to start as soon as possible.

(b) Garissa-Liboi

This section of the road comprises approximately 193 km from the end of the bitumen at Garissa to the Kenya/Somalia border. The first 41 km of this road can be described as good, following the recent gravelling carried out. The road is wide enough and the side drains in proper condition. The next approximately 113 km can be described as a good motorable track with a narrow running surface with side drains non-existent. The alignment soils are generally black cotton soil with silty or uniformly graded sand. The sections with predominantly black cotton soils show evidence of rutting and corrugation. The next 22 km was recently upgraded and gravelled. It displays a good road camper and riding surface. In general, the width is about 6 m. The last 16-km section can also be described as a track and has a good riding surface of white sand.

3. Highway design standards

| 1. Highway classification [1] | Trunk and primary (A-B-C) [2] | | | Secondary (D) [2] | | |
|---|---|---|---|---|---|---|
| 2. Average daily traffic | [3] | | | [3] | | |
| 3. Terrain classification | Level | Rolling | Mountainous | Level | Rolling | Mountainous |
| 4. Design speed (km/hour) | 80-120 | 60-100 (2) | 50-80 (3) | 80-100 (1) | 60-80 (2) | 40-80 (3) |
| 5. Right-of-way width (m) | | 2 x 30 m | | | 2 x 30 m | |
| 6. Roadway width (m) | | Item 7 - 3 | | | Item 7 - 8 | |
| 7. Carriageway width (m) | | 7.00 or 6.00 | | | 6.00 | |
| 8. Shoulder width (m) | 2.50 - 2.00 - 1.50 | | | 2.00 or 1.50 | | |
| 9. Minimum radius of horizontal curve (m) | (1) 400 | (2) 250 | (3) 80 | (1) 400 | (2) 180 | (3) 50 |
| 10. Minimum stopping sight distance (m) | (1) 170 | (2) 115 | (3) 55 | (1) 170 | (2) 95 | (3) 40 |
| 11. Pavement crossfall Permanent pavement (%) | | Bitumen 2.5% | | | Bitumen 2.5% | |
| Gravel, laterite pavement (%) | | Gravel 4% | | | Gravel 4% | |
| 12. Shoulder crossfall (%) | 6% (min. 2% if road under superelevation) | | | | | |
| 13. Type of pavement | Double seal or premix | | | Double seal | | |
| 14. Maximum superelevation (%) | 8% | | | 8% | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15. | Maximum vertical grade (%) | (1) | (2) 6% | (3) 9% | (1) 5.5% | (2) 7% | (3) 10% |
| 16. | Bridge loading | Full H.A. according to BS 153 25 units of class HB | | | In rare cases three-quarters of full HB mostly HA with 20 units of HB 5.5% | | |
| 17. | Minimum width face-face curbs (m) | Carriageway plus | | | 2 x 0.25 m | | |
| 18. | Minimum width face-face railings, trusses, head-walls, etc. (m) | Carriageway plus | | | 2 x 1.00 m (0.75) | | |
| 19. | Minimum vertical clearance (m) | | 5.25 | | | 5.25 | |
| 20. | Bridge sidewalk (m) | | 1.50 | | | 1.50 | |

1/ Indicate classification used if different from shown.
2/ A - international trunk road; B - national trunk road; C - primary road; D - secondary road.
3/ ADT in year 20

| MOW's road class | ADT | Cross-section |
|---|---|---|
| A/B | 10,000-15,000 | 4-lane |
| A/B | 5,000-10,000 | 2-lane |
| B/C | 2,000-5,000 | 2-lane |
| C/D | 800-1,000 | 2-lane |
| D/E | 500-800 | 2-lane |

## 4. Vehicle specifications

| | | | | |
|---|---|---|---|---|
| (a) | Weights and loading | | | |
| | Maximum total laden weight (kg) (excluding trailer) | 2 or 3 axles | | 22,500 kg |
| | | 4 or 5 axles | | 38,000 kg |
| | | 6 or more | | 43,000 kg |
| | Maximum wheel load (kg) | | | 3,200 kg |
| | Maximum single axle load (kg) | | | 8,000 kg |
| | Maximum tandem axle load (kg) | | | 11,300 kg |
| (b) | Vehicle dimensions | | | |
| | Over-all width (m) | | | 2.5 |
| | Over-all height (m) | | | 3.8 |
| | Over-length (m) | passengers: | 2 axles: | 11 |
| | | goods: | 2 axles: | 10 |
| | | | 3 axles: | 11 |
| | Articulated vehicle | | | 14 m |
| | Vehicle and trailer | | | 18 m |

A review of the above dimensions has been carried out by a firm of consultants and their recommendations are yet to be approved.

5. Road length, cross-section and 1979 ADT on segments of the Trans-East African Highway

| | Surface | Distance (km) | Cumulative distance (km) | Carriageway width (m) | Shoulder width (m) | 1979 ADT | % of heavies |
|---|---|---|---|---|---|---|---|
| Moyale | G [1] | 510 | 950 | 5.50 | 1.52 | 33 | 0 [2] |
| Isiolo | B | 02 | 440 | 6.30 | 1.70 | 820 | 4.0 |
| Nanyuki | B | 95 | 350 | 6.0 | 1.70 | 1,954 | 2.2 |
| Sagana | B | 46 | 263 | 7.0 | 2.5 | 1,530 | 3.7 |
| Makutano | B | 11 | 217 | 6.30 | 2.0 | 3,530 | 2.7 |
| Thika | B | 42 | 206 | 6.90 | 2.00 | 5,129 | 2.4 |
| Nairobi | B | 25 | 164 | 6.55 | 2.00 | 1,159 | 5.3 [2] |
| Athi River | B | 139 | - | 6.25 | 2.00 | [3] | [3] |
| Namanga | | | | | | | |

1/ 10 km of the Moyale-Isiolo road has sand seal on a trial basis.
2/ Depicts census carried out in 1980
3/ Not recorded.

B - Bitumen (440); G - Gravel (510)

6. Thika-Garissa-Liboi feeder link

| Road section | 1980 ADT | % of heavies |
|---|---|---|
| Thika-Kangondi | 598 | 11.5 |
| Kangondi-Garissa | Not carried out | |
| Garissa-Liboi | 17 | 0 |

7. Construction schedule for the Thika-Garissa-Liboi feeder link

| Road section | Length (km) | Timing in calendar year |
|---|---|---|
| Thika-Kangondi | 63 | 1977: 70 per cent complete |
| Kangondi-Garissa | 241 | To start mid-1981 |
| Garissa-Liboi | 201 | As soon as financier is available |

E. UNITED REPUBLIC OF TANZANIA

1. Namanga-Tunduma section of the Trans-East African Highway

The approved programme of action for the first phase of the United Nations Transport and Communications Decade in Africa includes project ROP-66 which requires the United Republic of Tanzania to upgrade the road from Arusha to Iringa via Dodoma, to either engineered gravel or bitumen standard. It is however worthwhile noting that the Government of the United Republic of Tanzania is already committed to that portion of the Cairo-Gaborone Trans-East African Highway which is within Tanzania, i.e., from Namanga at the border with Kenya to Tunduma at the Zambian border.

The current status of the Highway is as follows:

(a) Namanga-Arusha

| | |
|---|---|
| Length | 99 km |
| Road width | base 9 m (bitumenized)<br>pavement 6 m (bitumenized) |
| Shoulder width | 1.5 m |
| Terrain | Flat to rolling |
| Sight distance (SD) | 720 m |
| Over-all speed | 67 km/hour |
| Maximum axle load | 8.2 t for 2 single axles (6 wheels)<br>14.5 t for tandem axle and single axle (10 wheels) |
| Current status | Serviceable |
| ADT (1970) | 275 vehicles per day |

(b) Arusha-beyond Makuyuni

| | |
|---|---|
| Length | 105 km |
| Road width | base 9 m (bitumenized)<br>pavement 6 m (bitumenized) |
| Shoulder width | 1.5 m |
| Terrain | Flat to rolling |
| Sight distance (SD) | 560 m |
| Over-all speed | 70 km/hour |
| ADT (1970) | 300 vehicles per day |
| Current status | Great disintegration; requires major reconstruction; redesign in progress with M/S Straad Coop of Italy |

(c) Makuyuni-Dodoma-Iringa (574 km)

A total of 40 km is bitumenized on the approach to Dodoma and Iringa towns. The rest of the road is partly gravel and partly earth with a road width of about 8-9 m. The biggest problem at present is drainage as the existing road is below surrounding ground. The scope of work in this section includes an economic and technical study

to determine the most desirable and viable standard to be used during construction. In so going, an identification will be made of sections requiring upgrading to bitumen standards and those requiring upgrading to engineering gravel standards.

An earlier effort by the Government of the United Republic of Tanzania to have the studies and subsequently the construction of the project financed by the French Government proved unsuccessful. The World Bank is presently showing some interest in funding the project under the '6th Highway' umbrella.

(c) Iringa-Tunduma (part of TANZAM highway)

| | |
|---|---|
| Length | 459 km |
| Road width | base 9.8 m (bitumenized)<br>pavement 6.7 m (bitumenized) |
| Shoulder width | 1.55 m |
| Terrain | Rolling to mountainous |
| Geometrics | Good |
| Curvature | Min. 12; max. 32 |
| ADT (1970) | 275 vpd; 47 per cent trucks |
| Current status: | |

The road has deteriorated considerably, especially the Mbeya-Tunduma section. This latter section, 102 km long, requires reconstruction for about 30 per cent of its over-all length while the rest of the section requires strengthening by a 50 mm overlay. The costs of improving this stretch of the road are estimated at $US 10 million and expected to be completed within 18 months. The present position is that there is a likelihood of the World Bank financing the project under the "6th Highway" umbrella.

2. Feeder roads

(a) Dodoma-Morogoro-Dar-es-Salaam

(i) Morogoro-Dar-es-Salaam

| | |
|---|---|
| Length | 193 km |
| Road width | base 9.8 m (bitumenized)<br>pavement 6.7 m (bitumenized) |
| Terrain | Flat to rolling |
| ADT (1970) | Dar-es-Salaam-Chalinze: 900 vpd<br>Chalinze-Morogoro: 425 vpd |
| Condition | Serviceable-good |

(ii) Morogoro-Dodoma

| | |
|---|---|
| Length | 260 km |
| Surface | 50 per cent or more gravel |
| Terrain | Flat to rolling |
| Sight distance (SD) | 860 m |
| ADT (1970) | 200 vpd (now increasing due to cppital development |

Current status:

Poor. The road is now under construction to bitumen standards and is expected to be completed by December 1982. Financier: Bank of Brazil.

(b) Dodoma-Nzega-Rulenge

(i) Dodoma-Nzega (444 km via Singida)

| | |
|---|---|
| Base width | 6-9 m |
| Terrain | Part flat-rolling; part rolling-hilly |
| Sight distance | 240 m |
| ADT (1970) | approximately 40 vpd |
| Current status: | |

Partly gravel, partly earth with poor drainage facilities. It is expected that the Dodoma-Nzega portion will be undertaken immediately after the completion of the Morogoro-Dodoma road. Preliminary steps are being taken by the Government towards obtaining funds for this project from the Bank of Brazil.

(ii) Nzega-Nyakamazi-Kobero-Rusumo

Rusumo-Isaka (332 km) DD was completed in 1975. The road has been designed as a two-lane bitumen road with a 6.5 m-wide carriageway.

Construction of the Rusumo-Lusahunga portion (93 km) is in progress and it is expected to be completed by mid-1982. The project is estimated at about $US 20 million, part of which is financed by the African Development Bank.

Construction of the Lusahunga-Bukombe/Isaka section (127 km) is expected to begin in August 1981 and at an estimated cost of $US 25 million.

The Burundi link, Kobero-Rusumo, is yet to be designed but the work is expected to begin in January 1981 and it is to be financed by the EEC.

Detailed design of the last section Isaka-Nzega will be undertaken within the next five-year plan (1981/82-1985/86).

(c) Rulenge-Bukoba-Mtukula

(i) Mtukula-Bukoba (82 km)

This section has already been designed and its construction shall start within the next five-year plan.

Current status: Earth/gravel road with a base width of 6.4 m and a flat-rolling terrain. Drainage along the road is a major problem.

(ii) Bukoba-Biharamulo-Rulenge (220 km)

The detailed design of the Bukoba-Biharamulo portion has been completed and construction is included in the next five-year plan.

The Biharamulo-Rulenge portion requires detailed design to be done and this, together with construction, will be carried out during the next five-year plan.

Current status: Earth/gravel road with base width 7.1-9.0 m and a combination of flat-rolling and rolling-hilly terrain.

(d) Iringa-Mikumi-Morogoro (part of TANZAM highway)

| | |
|---|---|
| Length | 305 km |
| Base width | 6.8 m |
| Terrain | Rolling-hilly |
| Sight distance | 290 m |
| Current status: | |

Requires strengthening, especially between Morogoro and Mikumi (possibly under the World Bank's 6th highway project).

(e) Other notable features along the Great North Road

Construction of a dam across the Ruaha River at Mtera (about 120 km south of Dodoma) is in progress. The crest of the dam will form the permanent crossing for the road.

A 240-m bridge across the Kalema River (100 km north of Dodoma) has already been designed and its construction is scheduled to start during the 1981/82 financial year.

Characteristics of the bridge are as follows: 7.5 m of double-lane carriageway; 1.5 m footpaths on either side; 11.6 km approach roads.

Total cost of about $US 16 million is to be partly financed by the African Development Bank.

F. ZIMBABWE

While the actual Trans-East African Highway does not traverse Zimbabwe, some quite important feeder roads do. These are:

1. Lusaka-Beira road

This road passes through Chirundu, Salisbury and Umtali in Zimbabwe. The Zimbabwean section of this road is a 625-km 2-laned bitumenous facility. However, there are some 170 km of this road which require rehabilitation to prevent its rapid deterioration. Rehabilitation of the worst sections is scheduled to start shortly.

2. Salisbury-Zimbabwe/Botswana border

The road from Salisbury to the Zimbabwe/Botswana border near Plumtree is a 530-km facility of which 520 km has been constructed to a 2-lane bitumenous standard. Construction, to a similar standard, of the last 10 km between Plumtree and the border is scheduled to coincide with the completion of the road between Francistown and the border.

This road, when linked to the Salisbury-Beira section of the Lusaka-Beira road already referred to and a hoped-for road between Gaborone and Windhoek in Namibia, will result in an east-west route across southern Africa which will not only provide access across Namibia, Botswana, Zimbabwe and Mozambique but will also link the two land-locked countries of Botswana and Zimbabwe with additional port alternatives.

3. Beitbridge-Livingstone

The road between Beitbridge and Livingstone which is some 300 km long is also fully surfaced. However, 100 km on the section between Bulawayo and Beitbridge requires urgent rehabilitation.

4. Salisbury-Beitbridge

The Salisbury-Beitbridge road through Fort Victoria is some 560 km long, is fully surfaced and is in good condition.

Since Zimbabwe was not aware of the "Facilitation Check List" on standardization proposals, the delegation requested time to examine the proposals and the effect that their adoption would have on Zimbabwe, its road system and road users in view of the fact that there were numerous differences between these proposals and Zimbabwe's existing standards and regulations.

G. BOTSWANA

The section of the Trans-East African Highway in Botswana is now 912 km of which 613 km are bitumenized and 299 km gravel. The Nata-Kazungula section is expected to be bitumenized during the current development plan. The contract for the last 180 km was awarded in December 1980 at a cost of $US 14 million. The project is financed jointly by the Government of Botswana and the European Development Fund. Engineering services are partly covered by USAID.

The remaining 119 km is expected to follow immediately and the total project is expected to be completed by mid-1983. Funding of this last section has not yet been secured. The request for the $US 8 million required for the project was submitted to the Southern African Development Co-ordination Conference in Maputo in November 1980.

During the last meeting of the Co-ordinating Committee held in Khartoum in March 1978 feeder roads within or passing through Botswana was not considered. However, with the political changes having taken place since 1978 and expected to

take place in the near future, this should be taken into consideration at this stage.

Namibia-Mozambique (Beira)

This road is 1,070 km of which 180 are within Botswana. Of this, 100 km are bitumenized and the remaining 80 km are to be bitumenized by 1983.

The standard of the Trans-East African Highway in Botswana is in accordance with the recommendations of the Co-ordinating Committee, apart from the Nata-Kazungula section which, for technical reasons, has a 6 m paved width only.

The standard design elements are as follows:

(a) Gaborone-Ramokwebane road

| | |
|---|---|
| Axle loading | A load restriction of 8.2 tonnes per axle is applied to all roads in Botswana and pavement design is to be based on this restriction |
| Bridge loading | AASHO H20-S16 or equivalent |
| Bridges and culverts | Bridges and culverts are to be designed to a 50-year return period and other culverts to a 20-year return period with a 30-cm surcharge |
| Geometric design | Design speed: 120 km/hour |
| Horizontal alignment | Desirable minimum radius: 340 m<br>Maximum super elevation, e max 5 per cent<br>Minimum super elevation, e min 25 per cent<br>Rate of super elevation,<br>e - 5 per cent for 700 R 950 m<br>e - 4 per cent for 950 R 1,250 m<br>e - 3 per cent for 1,250 R 1,500 m<br>e - 2.5 per cent for 1,500 m<br>Super elevation run-off without transition curves: 100 m<br>Super elevation run-off with transition curve to equal the length of the transition curve<br>Transition curves to be used when curve radius is less than 1,500 m |
| Vertical alignment | Maximum grade: 4 per cent<br>Safe stopping sight distance: 200 m<br>Eye height: 1.2 m<br>Object height: 0.2 m |

| | | |
|---|---|---|
| Cross section | Road reserve width | 61 m |
| | Total road width (6.7 x 2 x 2.0) | 10.70 m |
| | Bitumenized surface width | 6.70 m |
| | Shoulder width | 2.00 m |
| | Base width | 7.00 m |
| | Sub-base width | 7.20 m |
| | Camber (in percentage) | 2.5 |
| | Shoulder fall (in percentage) | 3.5 |
| | Normal side slope | 1:4 |
| | Side slope, deep fill (H 2.0 m) | 1:2 |
| | Minimum height side drain to shoulder | 0.6 m |

(b) Francistown-Nata-Kazungula

The standard for Francistown-Nata are as (a) above and for Nata-Kazungula as follows:

| | | |
|---|---|---|
| Axle loading | A load restriction of 8.2 tonnes per axle is applied to all roads in Botswana and pavement design is to be based on this restriction | |
| Bridge loading | AASHO H20-S16 or equivalent | |
| Bridges and culverts | Bridges and culverts are to be designed to a 50-year return period and other culverts to a 20-year return period with a 30-cm surcharge | |
| Geometric design | Design speed: 120 km/hour | |
| Vertical alignment | Maximum grade: 4 per cent<br>Safe stopping sight distance: 200 m<br>Eye height: 1.2 m<br>Object height: 0.2 m | |
| Cross section | Road reserve width | 6 m |
| | Total road width | 7.4 m |
| | Bitumenized surface width | 6.0 m |
| | Shoulder width | 0.7 m |
| | Base width | 6.6 m |
| | Sub-base width | 1.4 m |
| | Camber (in percentage) | 2.5 |
| | Shoulder fall (in percentage) | 4.0 |
| | Normal side slope | 1:4 |
| | Side slope, deep fill (H 2.0 m) | 1:2 |
| | Minimum height side drain to shoulder | 0.6 m |

The completion dates for each road under construction are as follows:

| | |
|---|---|
| Ramatlabama-Lobatse | September 1981 |
| Dumela-Ramogwebana | July 1983 |
| Nata-Kazungula | July 1983 |

The road distances from the main centres to the Namibian border as as follows:

| | | |
|---|---|---|
| (a) | Francistown-Maun-Ghantsi-Mamono | 986 km |
| (b) | Lobatse-Jwaneng-Ghantsi-Mamono | 852 km |
| (c) | Gaborone-Francistown | 429 km |
| (d) | Gaborone-Lobatse | 72 km |
| (e) | Ramatlabama-Ramogwebana | 634 km |
| (f) | Ramatlabama-Nata-Kazungula | 1,040 km |

Road statistics

Number of vehicles in 1979, including Government:

| | |
|---|---|
| Cars | 5,708 |
| LDV | 8,363 |
| Lorries | 5,948 |
| Buses | 525 |
| Tractors | 1,945 |
| Trailers | 1,945 |
| Horse/tanders | 122 |
| Caravans | 152 |
| Motorcycles | 601 |
| Others | 399 |
| Total | 25,749 |

This is a 9 per cent increase on 1978.

Road lengths (gazetted)

| | Bitumen | Gravel | Earth/sand | Total |
|---|---|---|---|---|
| Main | 853 | 674 | 1,010 | 2,537 |
| Secondary | 142 | 451 | 1,531 | 2,124 |
| Minor | 86 | 317 | 2,686 | 3,089 |
| Total | 1,081 | 1,442 | 5,227 | 7,750 |

Road expenditures (in million Pula; 1 Pula - $US 1.30)

| | 1974/75 | 1975/76 | 1976/77 | 1977/78 | 1978/79 | 1979/80 | 1980/81 |
|---|---|---|---|---|---|---|---|
| Development | 10.5 | 10.0 | 15.6 | 14.1 | 18.3 | 20.0 | 10.0* |
| Recurrent | 2.1 | 2.4 | 1.6** | 1.8 | 2.0 | 2.7 | 3.1 |

* To date
** CTO costs removed